oppositely rotating gases more thoroughly. The gases mix more thoroughly when rejoined due to the turbulence created by the collision of their opposite flows (see specification page 12, third paragraph).

The Office Action acknowledges that Asou does not disclose the claimed subject matter of first and second turning means, within first and second passages, respectively, that turn a mixed gas received from a common passage in opposite directions (see Office Action page 3, second paragraph). To overcome this deficiency, the Office Action proposes that Komiya discloses this subject matter. The office action proposes that Komiya provides a motivation to modify Asou's hydrogen generator to incorporate the subject matter of first and second turning means, within first and second passages, respectively, that turn a mixed gas received from a common passage in opposite directions (see page 4, last paragraph, and page 5, first paragraph).

However, claim 1 defines the opposite directions of gas rotation from a single perspective. This perspective is the common direction of flowing gas through the two passages having common leading ends and common trailing ends.

On the other hand, Komiya's first and second gas flow paths do not have a common direction of gas flow; instead, Komiya's first and second gas flow paths have opposite gas flow directions. Thus, when viewed from the top of Komiya's structure, a gas rotating clockwise in one of Komiya's gas flow paths would seem to rotate counter clockwise in the other gas flow path because the gas flows downwards in one path and upwards in the other. However, for all points within Komiya's gas flow paths, the directional rotation of gas is the same with respect to the instantaneous direction of gas flow. Accordingly, Komiya does not disclose the claimed subject matter of two passages that rotate gas in opposite directions with respect to a common

directional flow of gas.

Moreover, since Komiya does not disclose first and second gas passages that branch from a common passage at their leading ends and join at their trailing ends, as acknowledged in the Office Action (see Office Action page 15, third paragraph, and page 3, first paragraph), it necessarily follows that Komiya cannot suggest rotating gases oppositely in the separate passages so that when combined the oppositely rotating gases mix more thoroughly. Thus, Komiya does not provide the motivation to achieve an object of the invention.

However, the Office Action proposes that a skilled artisan would be motivated to modify Asou's structure with Komiya's teachings so as to achieve objects different from Applicants' object. Specifically, the Office Action proposes the modified structure would gain the benefits provided by Komiya's structure of more uniform temperature distribution, better gas mixing, and the suppression of undesired side reactions (see page 4, second paragraph). However, Komiya's structure achieves the above-mentioned benefits without rotating gases oppositely with respect to a common direction of flow. Thus, Komiya's teaching would motivate a skilled artisan to employ a single direction of rotation with respect to a common directional flow of gas, rather than oppositely rotating gases, as recited in claim 1.

Accordingly, the Applicants submit that Komiya does not disclose the claimed subject matter for which it is cited and does not provide the motivation to modify Asou's structure to achieve this subject matter.

Furthermore, as mentioned above, the Office Action acknowledges that Komiya does not disclose a hydrogen generator having first and second gas passages that branch from a common passage at their leading ends and join each other at their trailing ends and, thus, cites Asou for

disclosing this feature (see Office Action page 15, third paragraph, and page 3, first paragraph).

However, Asou does not disclose branching a gas passage and then rejoining the branches, as proposed in the Office Action. Instead, Asou discloses, in Fig. 1, a two-dimensional representation of a three-dimensional cylinder. Although the two-dimensional representation may seem to partition a common gas passage 24 into left and right branches, separated by a burner 16, that rejoin at an exhaust port 15, the illustrated left-side and right-side channels are one and the same within the three-dimensional cylinder and are not physically separated in the three-dimensional object.

To the extent the Office Action is proposing that openings 23 between chamber 18 and chamber 22 constitute a branching of a common passage, the Office Action provides no indication as to how Asou's openings 23, chamber 18, and chamber 22 could be modified so as to turn a mixed gas received from a common passage in opposite directions, as the Office Action alleges is taught by Komiya, and thereby achieve more uniform temperature distribution and mixing and suppression of undesired side reactions (the motivation cited in the Office Action for modifying Asou's structure with Komiya's teachings).

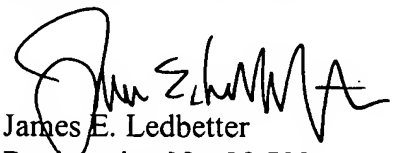
Komiya's structure achieves more uniform heat distribution because it distributes heat around the cylindrical chamber by helically directing gas to flow around the circumference of the cylinder. Komiya's structure mixes gas uniformly in a mixing chamber (see Komiya paragraph [0045]), and this does not seem to be effected by the rotation of gas in Komiya's gas flow paths. Komiya's structure suppresses undesired side reactions due to the placement of a heating channel (see paragraph [0043]); this also does not seem to be effected by the rotation of gas in Komiya's gas flow paths.

Thus, contrary to the position taken in the Office Action, the modification of Asou's structure to rotate gas would not seem to achieve the proposed benefits of mixing gas better in a mixing chamber and suppressing undesired side reactions. As for distributing heat more uniformly, the modification of Asou's openings 23, chamber 18, and chamber 22 to rotate the gas in chamber 18 in a different direction than in chamber 22 would seem to produce turbulence at the openings that would inhibit the rotational distribution of heat around the circumference of the cylindrical structure. Because the proposed modification of Asou's structure does not achieve the benefits identified in the Office Action, it is submitted that a skilled artisan would not find motivation to modify Asou's structure for the proposed reasons.

Accordingly, the Applicants respectfully submit that Asou and Komiya, considered alone or together, do not render obvious the subject matter defined by claim 1. Therefore, allowance of claim 1 and claims 2-13 dependent therefrom is deemed to be warranted.

If any issues remain which may best be resolved through a telephone communication, the Examiner is requested to telephone the undersigned at the local Washington, D.C. telephone number listed below.

Respectfully submitted,



Date: June 19, 2008

James E. Ledbetter
Registration No. 28,732

JEL/DWW/att
Attorney Docket No. 007002-06103
Dickinson Wright, PLLC
1901 L Street, N.W., Suite 800
Washington, D.C.
20036-3506
Telephone: (202) 457-0160
Facsimile: (202) 659-1559